Cost and Outcome Analyses on the Timing of First Independent Medical Evaluation in Patients With Work-Related Lumbosacral Sprain

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Objective: *To assess outcomes for different times to the first independent medical evaluation (IME) for work-related lumbosacral sprain.* ***Methods:*** *The 2005 West Virginia workers' compensation claims for "lumbosacral sprain" were used for our analyses. Outcomes included costs, maximal medical improvement status, number of IMEs performed, and the length of temporary total disability. Multiple logistic regression modeling was applied to determine the significance between the timing of first IME and these outcomes.* ***Results:*** *Patients with a first IME within 101 to 150 days after the injury had the best outcomes, measured by no repeat IMEs, appropriately reaching maximal medical improvement, and decreasing the temporary total disability length and related costs.* ***Conclusions:*** *Scheduling the first IME between 101 and 150 days after the injury contained indemnity costs, and shortened the length of disability.* (J Occup Environ Med. *2007;49:1264–1268*)

Low back pain is the most common reason for filing a workers' compensation claim, accounting for 16% to 25% of all workers' compensation claims and the major portion of all workers' compensation claim costs.[1–4] It is estimated that annual US workers compensation costs from low back pain exceed $9 to $11 billion. When lost wages and other uncompensable losses are involved, the costs may exceed $75 to $100 billion.[5,6] About 1% of the US working-aged population is permanently disabled and up to 1% of workers are temporarily disabled at any given time because of back pain, which accounts for 50% of all lost time from work.[7]

Although back pain is common, precise pathoanatomic diagnoses to explain the physiology of pain elude clinicians for the majority of patients.[8] This problem is characterized as nonspecific low back pain or sprain or strain or both. Most low back pain presentations have limited disability with return to work occurring within several weeks. Nevertheless, a small but significant minority of workers with low back pain have prolonged or permanent total inability to work. These long-term losses greatly affect the societal cost. About 10% of low back pain claims are responsible for a major portion of the total costs for all types of workers' compensation claims.[9,10] Clinical studies consistently show a poor correlation between clinician judgments

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of physical impairment and duration of disability or return to work, and also between disability duration and demographic variables such as age, sex, and education.[9–11] Other factors, including personality, organizational structure, posture, and physiological measurements of workload do predict some of the variability.[12–15]

Guidelines and rules have been developed to guide the management and limit the negative clinical and social consequences of low back pain.[16–19] In West Virginia, legislative Rule 20 guides medical practice and management of workers' compensation claims. One section of this rule specifies that a diagnosis of sprain or strain or both exceeding 8 weeks of lost time from work requires a detailed reevaluation and may require an independent medical evaluation (IME) to verify the diagnosis and potentially redirect management.[20] These guidelines provide the context of our study.

Workers' compensation insurers may rely on an IME to 1) confirm, revise, or update diagnoses, 2) assess if the patient has reached maximal medical improvement (MMI), 3) quantify impairment, 4) determine causality for the claim, and 5) redirect medical treatment if necessary. The timing of the first IME in those with delayed recovery is potentially associated with the length of disability and its related costs. A literature review concerning the timing of the first IME does not reveal any standardized management practice. No studies assess the optimal time for the first IME after the injury. A better understanding of the relationship between the timing of the first IME for lumbosacral sprain claims and its impact on costs and other measurable outcomes has potential implications for improving the quality of care, controlling costs, and helping claim managers to process claims more efficiently.

The purpose of this study is therefore to compare different periods of time to first IME for work-related lumbosacral sprain in association with its costs and some defined outcomes such as MMI status, number of IMEs performed, and the length of temporary total disability (TTD).

Materials and Methods

Data Source

The West Virginia Workers' Compensation claims data were used for our analyses. New cases became the responsibility of a private insurer, BrickStreet Mutual, on July 1, 2005. Access to data did not change. All claims with lumbosacral sprain or strain or both were identified by the date of injury within calendar year 2005. Any potential unique identifiers were excluded from our study. The West Virginia University Institutional Review Board granted an exempt status for this study.

Variables of Analysis

- Study population: Claims with lumbosacral sprain or strain or both identified by International Classification of Diseases-9 codes of 846, 846.0, 846.1, 846.2, 846.3, 846.8, 846.9, 847.1, 847.2, 847.3, 847.4, and 847.9.
- Time to the first IME: The duration between the date of injury and the date of performing the first IME by an independent medical examiner.
- Medical costs of the claim: All medical costs included physician's fee, physical therapy, rehabilitation program, medication costs, and "technical components" for facility services such as laboratory, imaging, and equipment.
- TTD days of the claim: The duration of TTD used to calculate the indemnity benefits. This measured not only the duration of TTD but also the length of disability eligible for indemnity benefits.
- The impairment rating of the injury: The impairment rating as a percentage formulated by an independent medical examiner during an IME based on the *AMA Guides to the Evaluation of Permanent Impairment*, 4th Edition. (The 4th edition is used in West Virginia.)
- Time of reaching MMI: Duration of reaching MMI from date of injury, which is a medical decision by an independent medical examiner or the treating physician. According to the AMA Guides, MMI is a condition or state that is well-stabilized and unlikely to change substantially in the next year, with or without medical treatment.
- Number of IMEs: Number of IMEs performed until claim closure.
- Patients' demographics: Age at date of injury and gender. Data on ethnicity was not available.

Statistical Analysis

Analyses were performed with Statistical Analysis Software Version 9.1 (SAS Institute, Cary, NC). Frequency analyses were used for the description of demographics, costs, health outcomes, and the different time frames for the first IME. Multiple logistic regression modeling was applied to assess the statistical significance between the timing of the first IME and total medical costs as well as defined outcomes such as the MMI status, number of IMEs performed, and length of TTD while controlling for age, gender, and the % total impairment rating if an impairment rating was assigned to the injury. The dependent variables were the different time frames for the first IME. The independent variables included TTD days, total medical costs, number of IMEs performed, time of reaching MMI, and patients' demographics. The statistical significance level was set at $P < 0.05$.

Results

In 2005, there were a total of 37,159 claims in the West Virginia Workers' Compensation information system. Of those, 7942 claims (21.4%) were identified as lumbosacral sprain or strain or both. Among the claims with lumbosacral sprain, 3123 (39.3%) had at least 1 day of TTD that qualified the claimants for indemnity benefits. About 49.9% of

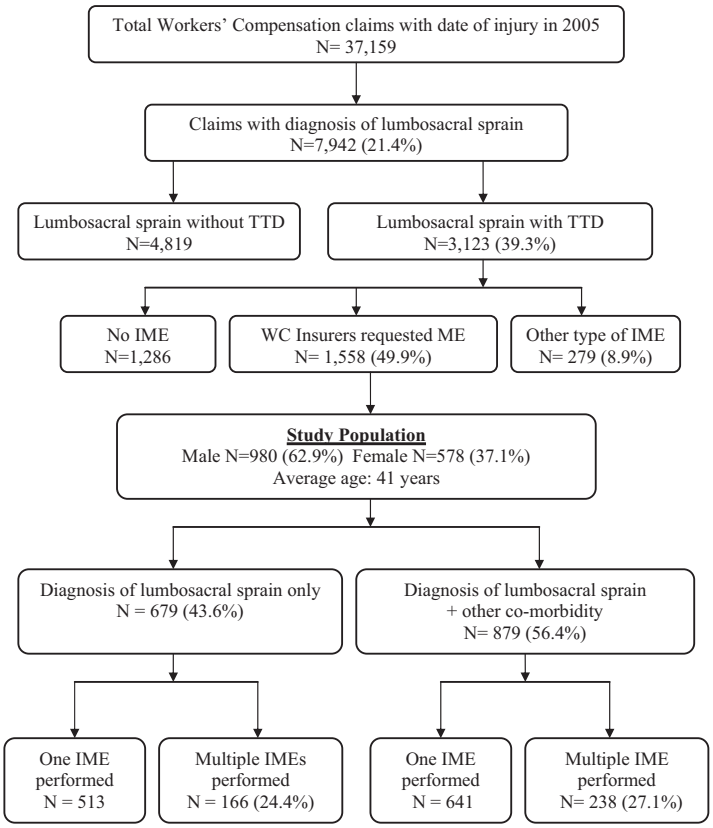

Fig. 1. Identification of study population.

lumbosacral sprain claims (1558) with TTD had at least one IME requested by the workers' compensation insurers, which were identified as our study population. Among those claimants, 980 were men and 578 were women with a mean age of 41 years. Among the 1558 lumbosacral sprain patients with TTD, 679 (43.6%) were diagnosed with lumbosacral sprain only, and 879 (56.4%) were with both lumbosacral sprain and other comorbidity. For patients with lumbosacral sprain only, one IME was performed in 513 (75.6%) and more than one IME was performed in 116 (24.4%). Similarly, for patients with both lumbosacral sprain and other comorbidity, one IME was performed in 641 (72.9%) and more than one IME was performed in 238 (27.1%) (Fig. 1).

Table 1 shows the frequency of different variables in relationship to the time until the first IME. The average medical cost for a lumbosacral sprain claim with TTD was $8046, and the costs increased as the time to performing the first IME prolonged. The mean duration of TTD days was 170 days for those claims with TTD, and the length increased as the time to performing the first IME increased. The mean impairment rating for a lumbosacral sprain with TTD was 5.6% of whole person, and increased as the time to performing the first IME prolonged. The duration of reaching MMI in patients with TTD who had one IME also increased as the time to performing the first IME increased.

Table 2 shows the relationship between the time for first IME and defined outcomes based on multiple logistic regression modeling. It was 2.6 times more likely to have multiple IMEs if the first IME was done within 100 days after the injury. Nevertheless, the likelihood was not significantly increased if the first IME was done 150 days after the injury. The likelihood of reaching MMI was slightly lower (odds ratio = 0.98) if the first IME was performed within 100 days after the injury. On the other hand, the likelihood of reaching MMI was higher if the first IME was performed after 150 days of the injury. There was a general increasing trend in medical costs as the time to performing the first IME increased. This trend slowed down after 150 days of the injury, and it was not statistically significant. Similarly, there was a general increasing trend in the length of TTD (and associated indemnity costs) as the time to performing the first IME increased. Patients with lumbosacral sprain only and patients with both lumbosacral sprain and other comorbidity seemed to be homogenous in this sense; there was no statistically significant difference in relation to the time of performing the first IME.

Discussion

Among all patients who received an IME in 2005 for lumbosacral sprain, the following was found. 1) The timing of the first IME was positively related to the length of TTD and associated indemnity costs. 2) Medical costs increased as the time to performing the first IME increased, but the increase in costs was only statistically significant up to 150 days after the injury. 3) An early first IME (<100 days) led to multiple IMEs. 4) A delayed first IME (>150 days) was associated with higher indemnity costs and longer disability. 5) Based on these findings, the optimal time for the first IME appears to be between 101 and 150 days after the injury as measured by no repeat IMEs, appropriately reaching MMI, and shortening the length of TTD. These findings applied to patients with or without other medical comorbidity.

An unexpected finding was that the total medical costs per claim did not closely follow the indemnity cost trend. Medical costs increased with time to first IME, but increases were not statistically significant after 150 days. Prolonged time to first IME

TABLE 1
Characteristics of Lumbosacral Sprain With TTD in Relationship to the Time of First IME

Characteristic Variables	Time of First IME From Date of Injury			
	≤100 d	101–150 d	151–200 d	>200 d
Status of comorbidity				
Lumbosacral sprain only	155	203	132	189
Lumbosacral sprain + other comorbidity	123	247	174	335
No. IME performed				
1	164	318	226	446
>1	114	132	80	78
Medical costs/claim ($)	6656	7319	8821	8954
TTD length (d)	134	154	194	188
Average impairment rating (%)	4.8	5.5	5.7	6
Average time to reach MMI				
Patients had one IME (d)	88	116	148	184

IME indicates independent medical evaluation; TTD, total temporary disability; MMI, maximal medical improvement.

TABLE 2
Relationship Between the Time to First IME and Defined Outcomes

Outcome Variables	Time to First IME From Date of Injury									
	101–150 d	≤100 d			151–200 d			<200 d		
	OR	OR	95% CI	*P*	OR	95% CI	*P*	OR	95% CI	*P*
Status of comorbidity										
No vs yes	1	1.30	0.91–1.83	0.15	1.06	0.72–1.57	0.78	1.04	0.67–1.62	0.85
No. IMEs performed										
1 vs >multiple	1	2.56	1.65–3.98	<0.01	0.65	0.38–1.13	0.13	0.69	0.38–1.26	0.23
Time to reach MMI	1	0.98	0.98–0.99	<0.01	1.05	1.04–1.06	<0.01	1.03	1.03–1.04	<0.01
All medical costs	1	1.00	0.99–1.00	0.05	1.00	1.00–1.01	0.06	1.00	1.00–1.01	0.12
TTD (d)	1	0.98	0.97–0.99	<0.01	1.05	1.04–1.06	<0.01	1.03	1.03–1.04	<0.01

Analyses based on multiple logistic regressions modeling after controlling for age, gender, and the impairment rate of the injury.
OR indicates odds ratio; 95% CI, 95% confidence intervals; MMI, maximal medical improvement; TTD, total temporary disability; IME, independent medical evaluation.

affects disability days more than medical costs. Assuming that impairments are more expensive and socially more important than medical costs, these findings imply that the timing for scheduling the first IME is critical to claim managers to contain the length of disability and its related costs. If this finding is correct, the process for approvals of necessary medical treatment, physical therapy, specialty referral, rehabilitation, and imaging studies should be pursued so that the first IME can be scheduled between 101 and 150 days after the injury. We cannot advocate for a further uniform shortening process toward the first IME despite some cost and time savings because the data may imply some compromise in the quality of care. Many patients were not medically ready for an IME during first 100 days of the injury, leading to multiple IMEs. To validate these findings, further research is warranted to assess the long-term outcomes such as reinjury rates and permanent total disability rates in relation to the timing of first IME in those patients.

Current management practice did not uniformly achieve this advantageous time frame, and systems obstacles may be relevant. Multifaceted delay in workers' compensation systems management include claim submission acceptance or denial, communication among claim managers, patients, and physicians, as well as understanding of medical management plan, and collecting the information for approvals of necessary medical treatments, imaging studies, medications, and physical therapies. If time management of systems delays improves care outcomes and cost-effectiveness of care, it is wise to ensure the financial reimbursement to patients and care providers as soon as the services are needed and provided. Similarly, the treating physicians need freedom for some standard and reasonable management plans such as ordering physical therapy, imaging studies when recovery is delayed, and specialty referrals when indicated. It is important to note that an IME can serve many purposes associated with claimants who have delayed recovery. If claim managers are interested in claimants' MMI status and impairment ratings, before case closure, the

optimal time for the first IME is between 101 and 150 days after the injury. Nevertheless, if claim managers are interested in redirecting medical treatment of their claimants, the data suggest a range of options including earlier IMEs. In this study, we used aggregate data for our analyses and did not look into specific reasons for the first IME. Further studies can be targeted to better understand outcomes and benefits based on the specific reason for obtaining the IME. For example, doing a first IME sooner than 100 days after the injury may be advantageous if the goal is to redirect treatment rather than provide assessment of impairment.

Our findings have important limitations. The results pertain to West Virginia, a state with a predominately extractive economy and hazardous jobs. It is possible that back pain is less problematic in other economic conditions. When this study was conducted, West Virginia may have used IMEs more frequently and differently than other states, which may rely on preferred providers. And, administrative data have major limitations for research. The data system is designed for monetary and administrative management of workers' compensation claims. Important outcome variables such as functional capacity, work limitations, patient satisfaction, and longevity in the workplace after return were not collected or were incompletely collected by the system. This limits our ability to study variables other than time and short-term economic outcomes. The administrative rules and legal obligations in the workers' compensation claim process reflect the reality of the complex disability management system rather than the natural recovery patterns of medical conditions. Our inferences were based on the available data and the current patterns of claim process. They may be different if the system management practices change.

In summary, the optimal time for the first IME for a work-related lumbosacral sprain was between 101 and 150 days after the injury, and scheduling the first IME during that time appeared to contain indemnity costs, shorten the disability length, and reduce the total burden of disease.

Clinical Significance

This study tried to understand the relationship between the timing of first IME for lumbosacral sprain claims and its impact on costs and other measurable outcomes, which may have potential implications for improving the quality of care, controlling costs, and helping claim managers to process claims more efficiently.

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